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10/522,182	02/01/2006	Isabelle Peslerbe	264543US41XPCT	3645

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EXAMINER	
SAVAGE, JASON L	
ART UNIT	**PAPER NUMBER**
1794	

NOTIFICATION DATE	DELIVERY MODE
07/23/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/522,182	PESLERBE ET AL.	
	Examiner	Art Unit	
	JASON L. SAVAGE	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 April 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *22,24,26-34 and 36-47* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *22, 24, 26-34, 36-47* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 22, 24, 29-34 and 36-42 and 45-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ress, Jr. et al. (US 6,190,133) in view of Sagel et al. (US 6,773,817).

Ress teaches a mechanical part such as airfoils having compressor blades **15** comprising a fist material forming a central core zone **23** and a second material forming a peripheral zone casing **22a** that surrounds the core (col. 3, ln. 44-67 and Figure 3). Ress further teaches that the first material core may comprise a matrix metal composite material (col. 1, ln. 5-15) which would meet the limitation of a metal matrix composite containing reinforcing elements dispersed therein. Ress further teaches that the core **23** and casing **22a** include a metallurgical bond (col. 5, ln. 28-42).

Regarding the limitation in claims 22 that the blade results from an initial compression step followed by a forging step, Ress does not explicitly recite the claimed steps. However, the claims are drawn to an article, not the method of making. Furthermore, Ress teaches the blade may be subjected to a compression step to form a metallurgical bond (col. 6, ln. 12-17) and also teaches that subjecting portions of the blade to processes such as forging is suitable (col. 4, ln. 53-65 and col. 3, ln. 30-43). As such, it would have been obvious to one of ordinary skill in the art to have

recognized that further processing of the composite blade such as subjecting the blade to compressing and forging could be employed with a reasonable expectation of success. One of ordinary skill in the art would have been motivated to subject the coated blade to forging so as to produce a composite blade which does not have internal imperfections which inherently result from a casting process.

Regarding the limitation that the core and casing are formed from a base metal of aluminum, Ress teaches employing components formed of aluminum alloys such as titanium aluminide (col. 3, ln. 8-42) although does not exemplify an embodiment wherein the core and casing are aluminum based.

Sagel teaches a mechanical part such as a blade for turbine components comprising a core **7** and a casing coating **6** (col. 4, ln. 19-38). Sagel further teaches that the core **7** may be an aluminum base metal such as Ti-Al (col. 4, ln. 19-38). Sagel also teaches that the casing coating **6** may be formed from a base metal Al alloy (col. 4, ln. 62-67). It would have been obvious to one of ordinary skill in the art to have employed an aluminum base metal such as described by Sagel as the casing material on the aluminum base metal core of Ress with a reasonable expectation of success since Sagel teaches that such a composite would be suitable.

As such, the component of Ress as modified by Sagel would meet the claimed component of a blade having a core and casing which are formed from an aluminum base metal wherein at least one of the aluminum materials includes a metal matrix composite with reinforcing elements.

Regarding claim 24, although the prior art does not explicitly recite the use of the claimed aluminum series alloys for the matrix materials, it would have been obvious to one of ordinary skill to have selected any aluminum series alloy material which could provide the blade of Ress as modified by Sagel with suitable properties of wear and corrosion resistance. Absent a teaching of the criticality or showing of unexpected results, the claimed aluminum series alloys would not provide a patentable distinction over the prior art.

Regarding claims 29-30, since the references do not specify if one or both of the layers contain reinforcing materials, it would have been an obvious design choice to one of ordinary skill in the art to determine if metal matrix composite material should be employed for a single or both layers and which of the layers should contain the reinforcing materials.

Regarding claims 31-34 and 39, it would have been obvious to have varied the proportion of reinforcing particles such as by forming a graded composition such as to tailor the properties of the mechanical part.

Regarding claims 36-37, the prior art teaches the reinforced components are used as turbine component parts such as airfoil blades.

Regarding claims 38, the prior art teaches compressing a core and casing which may be formed of an aluminum based material forming a metallurgical bond between the layers but is silent to forging the product after compressing. However, Ress teaches subjecting portions of the blade to processes such as forging is suitable (col. 4, ln. 53-65 and col. 3, ln. 30-43). As such, it would have been obvious to one of ordinary skill in

the art to have recognized that further processing of the composite blade such as subjecting the blade to compressing and forging could be employed with a reasonable expectation of success. One of ordinary skill in the art would have been motivated to subject the coated blade to forging so as to produce a composite blade which does not have internal imperfections which inherently result from a casting process. Regarding the limitation of machining the semi-finished product, it is conventional to machine a component after initially forming to provide the finished component.

Regarding claim 40, the prior art such as Ress teaches a first material composite core which extends in a longitudinal direction (figure 5) but it is silent to applying the second material as a sleeve. However, it is known that joining components such as forging so as to produce a composite blade which does not have internal imperfections which inherently result from a casting process. As such, it would have been obvious to have supplied the outer casing material as a solid component sleeve, inserted the core into the sleeve and joined the components by forging as opposed to casting so as to avoid forming internal imperfections from a conventional casting process

Regarding the limitations in claims 41-42 and 46-47 that the component is subjected to rolling/extrusion or die stamping at the recited temperature and pressure, the recited processing steps would have been obvious design choices for effecting the forging step. Absent a teaching of the criticality or showing of unexpected results of the claimed temperatures and pressure for processing the article, it would not provide a patentable distinction over the prior art.

Regarding claim 45, although the prior art does not teach passing an assembly through an orifice at an elevated temperature, forging conventionally employs increase temperature and thus would meet the claim limitation.

Claims 26-28 and 43-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ress, Jr. et al. (US 6,190,133) in view of Sagel et al. (US 6,773,817) as applied to claims 22, 24, 29-34, 36-42 and 45-47, further in view of Schilling (US 5,490,764) or Bedford (GB 2 242 848).

The prior art teaches what is set forth above but is silent to the recited claim limitations such as the use of the recited reinforcing element materials. However, the use of the recited materials are reinforcing elements including SiC with aluminum base matrix metals are know. Schilling teaches metal alloy blades reinforced with a metal matrix composite surface layer on a core blade (abs). Schilling further teaches the reinforcing material is an aluminum containing metal with silicon carbide (col. 4, ln. 46-52 and col. 3, ln. 3-16). Bedford teaches various metal matrix composite materials are known to be suitable for use as structural materials including titanium metal matrix composites as well as aluminum metal matrix composites reinforced with silicon carbide (p. 2, ln. 12-26). As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to have employed known reinforcing materials for the metal matrix composite layers such as silicon carbide with a reasonable expectation of success.

Regarding claims 27-28 and 43-44, while the prior art does not explicitly recite the claimed reinforcing element content, the selection of a desired content would have been an obvious design choice which would be selected through routine optimization and experimentation.

Response to Arguments

Applicant's arguments filed 4-9-09 have been fully considered but they are not persuasive.

Applicant argues that the prior art of Ress in view of Bedford do not meet the present claim limitations since the blade is manufactured by a compression step followed by a forging step. Applicant asserts the recited forging step causes a structural difference in the blade which leads to improved material structure and mechanical resistance properties in the blade. Applicant states that the technical parameters characterized in a forging process affect a fiber structure and rate of kneading of the material and forming micro dislocations and grain boundaries directed in a principal direction which provides improved mechanical properties. Applicant states by optimization of the noted technical parameters, the material is able to support the constraints and stresses of operation of a turbomachine. Applicant also recites that good control of displacements of matter during forging forms a strongly kneaded bi-material blade which is machinable and has a fiber structure in both the core and casing with improved mechanic properties. Applicant further states that deformation stress

inducing by the recited processing results in completely different behavior of the material.

However, these arguments are not commensurate in scope with the claims as there are no technical parameters recited for the claimed forging step in all except claims 46 and 47. It is not clear that any forging process regardless of the parameters such as duration of processing would form the recited structure. Furthermore, there are no limitations in the claims drawn to fibers, their orientation, micro dislocations, grain boundaries, induced stresses, kneaded structure or mechanical properties. As such, the arguments presented by Applicant are not commensurate in scope with the claims.

Furthermore, claims 22, 24, 26-34 and 36-37 are drawn to an article, not the method of making. Applicant has not provided any evidence which shows the claimed article which undergoes a forging step of unspecified process parameters would be any different from the article formed by the prior art which forms portions which are forged prior to compressing and/or which would be obvious to forge after compressing so as to form a composite which does not exhibit casting imperfections.

Applicant further argues that Ress does not teach a succession of compressing and forcing steps and a blade that includes an aluminum based metal matrix. As set forth in the rejection, it is known that forging can avoid the formation of imperfections due to casting and thus the use of forgoing would have been obvious. Regarding Applicant's statement that Ress is directed to forming a titanium metal matrix surrounded by a titanium alloy, Ress teaches the use of titanium-aluminum alloys including an aluminum based alloy such as Ti-45Al-5Nb-1W (col. 4, ln. 9-42). The use

of other aluminum base materials to form the blade of Ress would have been obvious such as is taught by Sagel.

Applicant also argues the Bedford fails to remedy the deficiencies of Ress. However for the reasoning set forth above, Ress as modified by Sagel is seen to meet the claim limitations.

Other Pertinent Prior Art Made of Record

The following is a listing of prior art which is found to be particularly pertinent to the present Application:

Pankratz et al (US 4,850,802) teaches composite components for turbomachines having a noncast core material and cast shell outer layer (col. 2, ln. 25-39). Pankratz further teaches that the noncast material such as forged aluminum alloys does not have internal imperfections which inherently result from a casting process (col. 2, ln. 3-13). Although Pankratz teaches that forming composites employing forged layers is not practical from a cost or manufacturing standpoint, it still teaches that forming composites by forging produces articles having improved properties compared to composites formed from casting.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON L. SAVAGE whose telephone number is (571)272-1542. The examiner can normally be reached on M-F 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on 571-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jason Savage/
Examiner
7-17-09

/JENNIFER MCNEIL/
Supervisory Patent Examiner, Art Unit 1794